

# Global Positioning System (GPS) Mainline Inventory



**Washington State**  
**Department of Transportation**

# What is the GPS Mainline Inventory?

- A Geographic Information Systems (GIS) “Roadtrack”, or cartographic representation for both directions of a State Route with a 3 to 5 foot accuracy

# Data Collection Methods

- Mainline Inventory Van
- Manual Collection
- Remote Acquisition

# GPS Mainline Inventory Van

- mobile office equipped for GPS (Trimble) & Inertial Navigation (Navstar) data collection
- contains two computer systems, GPS receiver, auxiliary data processor, heading gyrocompass, altimeter, and distance measuring instrument

# GPS Mainline Inventory Van

- simultaneously collects GPS and Inertial Navigation data
- creates and stores data files for later office processing
- performs inventory in both directions of State Route from ***innermost thru*** lanes

# Manual Collection

- portable GPS receiver used to collect XYZ coordinates for begin and end points of State Routes or portions of State Routes
- begin and end points are merged with Mainline Inventory points
- allows data to be collected for those locations inaccessible to the Inventory Van

# Remote Acquisition

- portable GPS receiver and ***laser rangefinder*** used to collect ***offset*** and XYZ coordinates for begin and end points of State Routes or portions of State Routes
- begin and end points are later merged with Mainline Inventory points
- allows data to be collected for those locations inaccessible to the Inventory Van

# Data Processing Methods

- GPS Data Post Processing
- GPS - Inertial Navigation  
Data Merge
- Roadtrack Editing

# Data Processing is used to:

- increase accuracy of the GPS positions collected
- create an integrated file containing both Inertial Navigation and GPS data
- “smooth” the roadtrack points
- prepare a cartographic-ready file for creating GIS “smart road” layer with dynamic segmentation

# Dynamic Segmentation

- GIS function that locates a point or line segment by interpolating the distance between two known points
- allows the recording of information along linear features
- location is given in terms of a known feature, e.g., “SR 004” and a position or measure on it
- this position is expressed in terms of State Route Milepost (SRMP) or Accumulated Route Mileage (ARM)

# Recent Applications of Mainline Inventory

- Improves safety and efficiency of spring snow removal on mountain pass highways
- Enables crews to better find and stay within roadway boundaries when plowing, thus avoiding damage to guardrails

# Future Plans

- Complete the GPS Mainline Inventory on all State Routes including Ramps by June 2007
- Provide training to WSDOT personnel to ensure that consistent GPS data collection procedures are used throughout the department